REGULAR UTILITY

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SERIAL NUMBER	FILING DATE	CLASS	SUBCLASS	GROUP ART UNIT	EXAMINER
06/455,115	01/03/83	340	707	234 264	Brignac

APPLICANTS

ZENJI HARADA, HYOGO, JAPAN; OSAMU TERAOKA, OSAKA, JAPAN; TSUNEO MIKADO, TOKYO, JAPAN.

CONTINUING DATA*******************
VERIFIED

JUNE 293

FOREIGN/PCT APPLICATIONS*********
VERIFIED

	Japan	57-2531	11 January '82
	"	57-6971	20 January '82

Foreign priority claimed ☑ yes ☐ no 35 USC 119 conditions met ☑ yes ☐ no Verified and Acknowledged Examiner's initials	AS FILED →	STATE OR COUNTRY JPX	SHEETS DRWGS. 3	TOTAL CLAIMS 5	INDEP. CLAIMS 1	FILING FEE RECEIVED $ 300.00	ATTORNEY'S DOCKET NO. TS-25/629

ADDRESS

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TITLE PICTURE PROCESSING SYSTEM

U.S. DEPT. of COMM.-Pat. & TM Office — PTO-436L (rev. 10-21)

AX203767

PARTS OF APPLICATION FILED SEPARATELY

PREPARED FOR ISSUE

(Assistant Examiner)	(Docket Clerk)

EXAMINED AND PASSED FOR ISSUE

AT ALLOWANCE

SHEETS DRWGS.	FIGURES DRWGS.	CLAIMS	CLASS	SUBCLASS

(Primary Examiner)	(Art Unit)

Estimate of printed pages		Issue fee due (est.)
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Date mailed		Date paid

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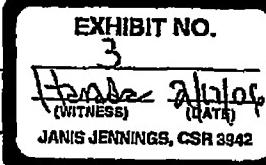
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455115

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CONTENTS

1. Applications papers
2. *[illegible handwriting]* Jan. 3, 1983
3. Priority Papers Aug. 22, 1983
4. Reject (3 mo.) Jan. 25, 1985
5. *[illegible handwriting]*
6. Priority Papers
7. *[illegible]* Nov. 13, 1985
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10. Ltr. Transfer Drugs May 12, 1986
11. *[illegible]* Access 9-13-01
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.455115

Case Doc. : No. TS-25/F2919

THE COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231.

Sir:

Transmitted herewith for filing is the patent application of

Inventor: Harada, Teraoka and Mikado

For: PICTURE PROCESSING SYSTEM

Enclosed are:

[X] Three   sheets of drawing. (Formal)

[X] An assignment of the invention to NIPPON TELEVISION INDUSTRY CORP., and KANSAI TELECASTING CORPORATION; 1-26-2-302, Nishigotanda, Shinagawa-Ku, Tokyo, Japan; and 5-17, Nishitenma 6-chome, Kita-ku, Osaka, Japan.

[ ] A certified copy of a _____ application.

[X] An associate power of attorney.

[ ] A verified statement to establish small entity status under 37 CFR 1.9 and 37 CFR 1.27.

[X] Specification, inc. claims & abstract (pp. 1-12) and Declaration and Power of Attorney

The filing fee has been calculated as shown below:

FOR:	(Col. 1) NO. FILED	(Col.2) NO. EXTRA		SMALL ENTITY RATE	FEE	OR	OTHER THAN A SMALL ENTITY RATE	FEE
BASIC FEE					$150	OR		$300
TOTAL CLAIMS	5 -20=	0		x5=	$	OR	x10=	$ 0
INDEP. CLAIMS	1 -3=	0		x15=	$	OR	x30=	$ 0
[ ] MULTIPLE DEPENDENT CLAIM PRESENTED				+50=	$	OR	+100=	$
				TOTAL	$	OR	TOTAL	$ 300

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    [X] Any patent application processing fees under 37 CFR 1.17.

    [ ] The issue fee set in 37 CFR 1.18 at or before mailing of the Notice of Allowance, pursuant to 37 CFR 1.311(b).

    [X] Any filing fees under 37 CFR 1.16 for presentation of extra claims.

AX203769

12/29/82
(Date)

(Attorney of Record)
Norman L. Norris, Reg. #24,196

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Title: PICTURE PROCESSING SYSTEM

Inventors: Zenji Harada, Osamu Teraoka and
Tsuneo Mikado

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BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to a picture processing apparatus for selecting a desired picture from a plurality of still pictures formed on a monitor screen by means of selecting means and rearranging them in a desired order.

Description of the prior art

A picture display system for reproducing digital information representative of a plurality of still pictures (about 100 fields, for example) recorded in a disk type recording medium and displaying it on a monitor has been well known as prior art. Such a system as this is generally used, in a TV station for example, for a programming apparatus of a picture on-air control system by which programs in a predetermined order arranged in advance are automatically progressed by use of a plurality of VTRs. In this programming apparatus picture or character information representative of the contents of each program such as news program or commercial program is recorded in a floppy disk and the like in the form of one still picture information. This information is rearranged in the desired order while reading it out at the time of making the program. The picture on-air control system is controlled with the rearranged information.

In this type of programming apparatus it generally takes approximately 0.4 sec to reproduce the still picture of one field, and a time interval of 1.6 sec is required for the case of color picture consisting of four fields in

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one unit of color frame. Thus, an extremely large amount of time is required to find out the desired pictures. Alternatively, a method of selecting the desired picture information through an index in the form of a document is conceivable, but it is impossible to express the contents of the picture completely by use of the document and it also takes a lot of time to fabricate such index as mentioned above.

A picture display system was proposed by same assignee of this invention in US patent application under serial No.437,317, in which the problems mentioned above are settled. In the picture display system, a plurality of still pictures are recorded in a recording member. The recording member has index tracks for storing a series of information representative of a plurality of squeezed still pictures corresponding to the original still pictures, and an index screen is formed on which a group of squeezed still pictures is displayed in multiple segmented areas prepared on the screen with accompanied by reference numerals.

By using this type of index screen, program arrangement tasks can drastically be simplified. In short, the contents of the plurality of still pictures can be observed at a glance by looking into the index screen without requiring to reproduce and display them one by one. In addition, a program advancing schedule can be completed by selecting the pictures on the index screen in the desired order.

Besides it will be possible to know the schedule of programs through the index screen. In short, the scheduled programs can be displayed on the index screen with an arrangement of squeezed picture elements. The programmed index screen can be formed by selecting the squeezed pictures in order

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of program, storing the selected picture information in a picture memory one after another and then reading out the programmed information. In this case, alteration or rearrangement of program requires replacement or insertion of the squeezed pictures on the index screen indicating an arrangement in accordance with a certain schedule.

Generally, the selection, replacement and insertion of the squeezed pictures on the index screen are achieved through a key input unit including ten keys for data input and function keys such as "Insert" key, "Change" key or "Execution" key for operation command.

The key input operation is very troublesome when the alteration or rearrangement of program is requested during on-air of the program. And the key input operation is apt to cause errors, resulting in on-air accidents.

SUMMARY OF THE INVENTION

It is therefore a primary object of the present invention to settle such drawbacks as mentioned above, that is, to accomplish quick selection of the desired pictures from a plurality of squeezed still pictures on the index screen.

Another object of the present invention is to accomplish simple and accurate insertion of the selected pictures into the desired positions between the still pictures arranged on the index screen.

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BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the present invention, its construction and mode of operation, reference is made to the following description of preferred embodiments and the appended drawings in which:

Fig. 1 shows a block diagram of a picture processing apparatus in accordance with the present invention;

Fig. 2 shows a front view of an index screen used for explaining quick selection of the desired pictures;

Figs. 3 and 4 show views similar to Fig. 2 and used for explaining simple and accurate insertion of the desired pictures; and

Fig. 5 shows a plane view of a X-Y coordinate input device to be mounted on a screen.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to Fig. 1 wherein a block diagram of the picture processing apparatus in accordance with the present invention is illustrated, an input video signal a is converted into a series of digital signals, and the still picture information of one color frame is written into a picture memory 2. The outputs read out of the memory 2 are supplied to a disk type recording/reproducing apparatus 3 and then recorded therein. By repeating this recording operation, picture information corresponding to a plurality of still pictures can be recorded to the disk. The speed for reading the picture memory 2 is modified so as to match the speed of rotation of the disk.

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The outputs of the picture memory 2 are also provided to a "squeezer" 4. The squeezer 4 has a specific function to reduce or "squeeze" the picture size to one-fourth the original and is so constructed that three scanning lines are thinned out of four scanning lines and three sampling points on the scanning line are thinned out of four sampling points at the time of analog/digital conversion, for example. The outputs of the squeezer 4 are fed to the disk type recording/reproducing apparatus 3 and recorded in a predetermined part, that is, tracks assigned for index recording.

In reproduction operation, the outputs reproduced from the index track in the disk type recording/reproducing apparatus 3 are first supplied to an index memory 5, and recorded therein as information for one index screen. The outputs of the index memory 5 are then delivered to a D/A converter 7 through a changeover device 6 and converted therein to analog picture signals. The outputs of the D/A converter 7 are applied to a monitor television (TV) and then displayed on a screen thereof.

As clearly indicated in Fig. 2, the screen 12 of the monitor TV is divided into a plurality of segments (in this example, 16 segments) and each of the squeezed still pictures is displayed on each of the segments (1 to 8). To the respective segments, the reference numerals 1 to 16 are assigned by superimposing them on the pictures, or by noting down them on a transparent plate located in front of the screen. In this example, the screen 12 including a group of squeezed still pictures and reference numerals will be used as an index screen.

Like these, the required information can be selected

by looking into the index screen 12 of Fig. 2. The selected
still picture information will be reproduced by giving instructions
representative of the index reference numerals to the disk
type recording/reproducing apparatus 3, which can access
in a random manner to any one of required track. The reproduced
signals will be recorded in the picture memory 8. As previously
described, the outputs of the picture memory 8 will be fed
to the monitor TV via the changeover device 6 and the D/A
converter 7, and displayed on the screen thereof as a selected
still picture.

In this paragraph, the selection of the desired
still pictures by utilization of the index screen 12 illustrated
in Fig. 2 will be concretely explained. The index reference
data representing respective squeezed picture can be detected
by means of a light pen 10. The information corresponding
to the desired index number is detected through a detecting
circuit 9 directing the light pen 10 onto one of squeezed
still pictures to be selected.

The output of the detecting circuit 9 is provided
to the disk type recording/reproducing apparatus 3. A selected
still picture information is reproduced therefrom, and then
recorded in the picture memory 8. The outputs of the picture
memory 8 are provided to the monitor TV through the changeover
device 6 and the D/A converter 7 and displayed on the screen
thereof as a selected still picture pattern.

Next, the selection, replacement and insertion
operation for squeezed index pictures in the case where a
second index screen 14 shown in Fig. 3 is utilized instead
of the first index screen 12 will be explained. As clearly
indicated in Fig. 3, the second index screen 14 is provided

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with intermediate regions 13 between the respective segments.
The intermediate regions 13 can be represented by gate signals
produced on the basis of horizontal and vertical sync signals
and detected depending on the gate signals at a time when
the intermediate regions 13 are designated by means of the
light pen 10.

In making a desired schedule of TV programs, the
operator reads out index pictures from the apparatus 3 just
as mentioned before and then selects the pictures *displayed*
on the index screen 14 in the desired order by means of the
light pen 10 to obtain a series of picture selection information.
The output of the index number detecting circuit 9 is fed
to a memory replacement control circuit 11 in response to
the key input signals selected on a *keyboard* (not shown).
The squeezed picture information selected through this step
are transferred to the picture memory 8 in the selected order.
At the same time, the index reference numbers corresponding
to the selected pictures are stored in a schedule memory
portion of the index memory 5 in the designated order.

When a series of schedules have been completed,
the contents of the picture memory 8 are transferred back
to the index memory 5 through the manipulation of an "End"
key on the *keyboard*. The contents of the index memory are
displayed on the monitor screen through the changeover device
6 and the D/A converter 7 and the scheduled program sequence
1, 2, 3 ...... can be observed on the so called multi-screen
14 shown in Fig. 3.

The sequence of the programs is replaceable by
instructing the pictures on the multi-screen by means of
the light pen. For example, when the sequence of programs

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represented by the squeezed pictures 6, 7 is to be replaced,
the operator designates the screen segments 6 and 7 by means
of the light pen 10 and manipulates a "Change" key on the
keyboard. As the result, the memory replacement control
circuit 11 is operated so that the squeezed picture information
corresponding to regions 6, 7 in the index memory 5 is mutually
replaced, and at the same time, the index reference numerals
written in the schedule memory portion within the index memory
5 are mutually replaced.

Next, the operation for inserting another program
into between the already-scheduled programs will be explained·
in detail in connection with ordinal methods.

As one typical method, it is assumed that the squeezed
picture 5 is to be inserted into between the squeezed pictures
1 and 2, for example. The operator first designates the
picture 1 and then the picture 5 by use of the light pen
10, and thereafter manipulates an "Insert" key on the key-
board. The memory replacement control circuit 11 is thereby
operated just as similar to the abovementioned replacement
operation. As the result, the picture 5 is inserted between
the pictures 1 and 2, and the pictures 2, 3 and 4 are shifted
by one segment in order, respectively. This insertion process,
however, is liable to lead to error, because when the operator
wishes to insert the picture 5 before the picture 2, he may
erroneously designates the pictures 2 and 5 in this order
by use of the light pen 10 and thereafter manipulates the
"Insert" key, without operating the correct processes, 1 → 5 →
"Insert" key. This operation steps results in the mistaken
rearrangement; 1, 2, 5, 3 and 4.

To prevent such erroneous operation as this, in

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this embodiment, the intermediate region 13 is provided between the respective segments on the index screen, as indicated by the hatched region in Fig. 3. As described previously, this intermediate region 13 can be represented by the gate signals produced based on the horizontal and vertical sync signals, and it can be detected on the basis of the gate signal obtained when the operator designates the intermediate region 13 by use of the light pen 10.

Now it is assumed that the picture 5 is to be inserted into between the pictures 1 and 2 by utilization of the intermediate region 13. In this case, the operator first designates the picture 5 and then the intermediate region 13 located between the pictures 1 and 2, and thereafter manipulates the "Insert" key on the key-board. The respective outputs, the index number detecting circuit 9 and the "Insert" key are thereby fed to the memory replacement control circuit 11, and the insert operation for the squeezed pictures and the reference numerals is carried out. As the result, such a rearranged program as shown on the monitor screen 14 in Fig. 4 is obtained. As clearly understood from the foregoing, the aforesaid insertion process is extremely simple and any erroneous operation can be avoided.

An X-Y coordinate input device may be used as well instead of the light pen 10. This input device may be a conventional one which is formed by arranging transparent electro-conductive films and the like in the form of a key switch train 17 in a form of matrix as indicated in Fig. 5. The necessary pictures can be selected by disposing the transparent input device over the monitor screen so as to touch it directly, and manipulating some of the coordinate keys

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corresponding to the squeezed index pictures on the monitor
screen.

In addition, if a key switch train 15 corresponding
to the intermediate region 13 of Fig. 3 is arranged between
the key switch trains 17 located on the respective picture
segments as shown in Fig. 5, they can be used at the time
of insertion operation. Since the insertion operation is
just similar to the case of the light pen, the operator first
selects the pictures to be inserted by use of the key switch
train 17, and then manipulates the key switch train 15 showing
the position for insertion.

As clearly understood from the foregoing, the picture
processing apparatus of this invention is so constructed
that the squeezed still pictures can be displayed on one
screen divided into a plurality of segmented areas, and each
segment and the intermediate region between the segments
can be selected on the screen. Rearrangement operation of
the multiple segmented screen, such as insertion operation,
can be easily achieved without errors, by designating one
of segments and one of intermediate regions.

This invention having been described in its preferred
embodiments, it is clear that numerous modification and changes
may be made by those skilled in the art without departing
from the broader scope and spirit of the invention.

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WHAT IS CLAIMED IS:

1. A picture processing system comprising a recording member in which a plurality of still picture informations is recorded and a monitoring means for reproducing one of said still picture information and displaying the still picture on a screen, said recording member having an index recording portion in which a series of picture information representative of a plurality of squeezed still pictures each corresponding to each of said original still pictures is recorded, and said monitoring means comprising memory means for storing reproduced squeezed still picture information, a group of said squeezed still pictures being displayed on the basis of the output of said memory means in multiple segmented areas formed on said screen as an index picture information; selecting means for designating one of said multiple segmented areas on said screen to select one of said squeezed still pictures; and memory control means for rearranging the contents of said memory on the basis of the output of said selecting means to rearrange said index picture information.

2. A picture processing system according to claim 1, wherein said selecting means comprises a light pen and a detecting circuit for detecting the position of said segmented areas designated by said light pen on the basis of horizontal and vertical sync signals for said screen.

3. A picture processing system according to claim 1, wherein said selecting means comprises a transparent key board unit provided on said screen, said key board unit

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comprising a matrix of keys each corresponding to each of said segmented areas.

4. A picture processing system according to claim 2, wherein said detecting circuit comprises means for detecting intermediate regions respectively provided between two adjacent said segmented areas on said screen, and said memory control means receives a detecting signal corresponding to one of said intermediate regions for rearranging the contents of said memory so that one of selected squeezed pictures is interposed between selected two akjacent squeezed pictures which are appointed by designating one of said intermediate regions.

5. A picture processing system according to claim 3, wherein said transparent key board unit further comprising another matrix of keys each corresponding to each of intermediate regions respectively provided between two adjacent said segmented areas, and said memory control means recieves the output of one of said another matrix of keys corresponding to one of said intermediate regions for rearranging the contents of said memory so that one of selected squeezed pictures is interposed between selected two adjacent squeezed pictures which are appointed by designating one of said intermediate regions.

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PICTURE PROCESSING SYSTEM

ABSTRACT OF THE DISCLOSURE

A picture processing system for displaying a plurality of still pictures recorded in a recording member. The recording member has index tracks for storing a series of information representative of a plurality of ~~squeezed~~ still pictures corresponding to the original still pictures. A group of ~~squeezed~~ still pictures is ~~displayed~~ in multiple segmented areas formed on ~~an~~ index screen with accompanied by reference numerals. A light pen and a sensing circuit is provided for rearranging the index screen. The light pen detects the position of said segmented areas and intermediate regions respectively provided between two adjacent areas for processing the rearrangement.

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COMBINED DECLARATION AND POWER OF ATTORNEY
IN ORIGINAL APPLICATION

ATTORNEY DOCKET NO.

As a below named inventor, I hereby declare that:

my residence, post office address and citizenship are as stated below next to my name; that

I verily believe that I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named below) of the invention entitled: **PICTURE PROCESSING SYSTEM**

described and claimed in the attached specification, that I understand the content of the attached specification, that I do not know and do not believe the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application, that I acknowledge my duty to disclose information of which I am aware which is material to the examination of this application, and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to this application by me or my legal representatives or assigns, except as follows: **Japanese Patent Application No.2531/1982, filed on January 11, 1982; and Japanese Patent Application No.6971/1982, filed on January 20, 1982**

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith: **Norman L. Norris, Esq.**

Registration No. **24,196**

of the firm of WOODCOCK WASHBURN KURTZ MACKIEWICZ & NORRIS, 1800 United Engineers Building, 30 South 17th Street, Philadelphia, Pa. 19103.

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Address all correspondence to **WOODCOCK WASHBURN KURTZ MACKIEWICZ & NORRIS**

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

FULL NAME OF SOLE OR FIRST INVENTOR	INVENTOR'S SIGNATURE	DATE
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Osaka, Japan		
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Tsuneo Mikado	*signature*	December 6, 1982
RESIDENCE		CITIZENSHIP
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4-1-5-307, Shimomeguro, Meguro-ku, Tokyo, Japan		
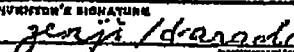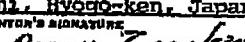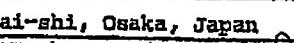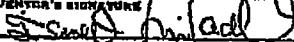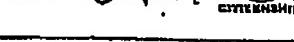
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May 28, 2004

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FILING DATE: February 24, 1987
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ISSUE DATE: April 11, 1989

By Authority of the
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T. LAWRENCE
Certifying Officer

AX061557

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Patent and Trademark Office
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Washington, D.C. 20231

SERIAL NUMBER	FILING DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NO.
06/483,927	04/08/83	BEAULIER	AV-3033

PATENT DEPT.
AMPEX CORP.
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REDWOOD CITY, CA 94063

EXAMINER
HARVEY, D

ART UNIT	PAPER NUMBER
262	3

DATE MAILED: 12/21/84

This is a communication from the examiner in charge of your application.

COMMISSIONER OF PATENTS AND TRADEMARKS

[X] This application has been examined.   [ ] Responsive to communication filed on _____   [ ] This action is made final.

A shortened statutory period for response to this action is set to expire __3 (three)__ month(s), _____ days from the date of this letter.
Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133.

Part I   THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

1. [X] Notice of References Cited by Examiner, PTO-892.
2. [ ] Notice of Art Cited by Applicant, PTO-1449
3. [ ] Information on How to Effect Drawing Changes, PTO-1474

2. [ ] Notice re Patent Drawing, PTO-948.
4. [ ] Notice of Informal Patent Application, Form PTO-152
6. [ ] _____

Part II   SUMMARY OF ACTION

1. [X] Claims _____1 - 14_____ are pending in the application.

   Of the above, claims _____ are withdrawn from consideration.

2. [ ] Claims _____ have been cancelled.

3. [ ] Claims _____ are allowed.

4. [X] Claims _____1 - 14_____ are rejected.

5. [ ] Claims _____ are objected to.

6. [ ] Claims _____ are subject to restriction or election requirement.

7. [ ] This application has been filed with informal drawings which are acceptable for examination purposes until such time as allowable subject matter is indicated.

8. [ ] Allowable subject matter having been indicated, formal drawings are required in response to this Office action.

9. [ ] The corrected or substitute drawings have been received on _____. These drawings are [ ] acceptable; [ ] not acceptable (see explanation).

10. [ ] The [ ] proposed drawing correction and/or the [ ] proposed additional or substitute sheet(s) of drawings, filed on _____ has (have) been [ ] approved by the examiner. [ ] disapproved by the examiner (see explanation).

11. [ ] The proposed drawing correction, filed _____, has been [ ] approved. [ ] disapproved (see explanation). However, the Patent and Trademark Office no longer makes drawing changes. It is now applicant's responsibility to ensure that the drawings are corrected. Corrections MUST be effected in accordance with the instructions set forth on the attached letter "INFORMATION ON HOW TO EFFECT DRAWING CHANGES", PTO-1474.

12. [ ] Acknowledgment is made of the claim for priority under 35 U.S.C. 119. The certified copy has [ ] been received [ ] not been received

   [ ] been filed in parent application, serial no. _____; filed on _____

13. [ ] Since this application appears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.

14. [ ] Other

PTOL-326 (Rev. 7-82)   EXAMINER'S ACTION

Serial No. 483,327

-2-

1.   Claims 1-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention.

The claimed invention deals with the storage, retrieval, and size reduction of still video images. The apparent novelty of the claimed system is that a "stored video frame", corresponding to a given video image, includes a full resolution and a quarter resolution copy of the said video image. This definition of "frame" seems to be made on page 7, lines 7-10, of the disclosure where it is stated, "as a new frame of video data is transferred from the frame store 22 to the disk store 24 for more permanent storage, both the full resolution and quarter resolution copy are transferred." Thus "frame" is interpreted, as described in the disclosure, to define a frame of data which incudes both a full and a quarter resolution copy of a given image.

The use of "frames" in claim 1, lines 3-5, is indefinite. It is not clear whether "frames of video images" refers to either full resolution frames or quarter resolution frames or to frames which contain both a full and a quarter resolution copy.

In claim 1, lines 8-15, and in claims 2, 3, 6 and 7 the use of the term "frame" is also indefinite. It becomes very confusing when "frame" seems to describe two different techniques of data storage. In the first case, "frame" seems to refer to data which contains both resolution copies and in the next case it seems to refer to separate full and reduced resolution "frames".

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AX061588

Serial No. 483,327

-3-

In claim 1, line 7, the use of "receive" is indefinite. The claim does not clearly state what is being received.

In claim 4, lines 4&5, the use of "frame store" seems to be incorrect. The claim implies that image copies are retrieved from the frame store and then stored back in the same frame store at a different location.

In claim 4, line 6, and in claim 5, lines 5-7, the use of the terms "image copy" and "image" is indefinite when referred back to the problems as stated for claim 1. The distinction among "frames", "images" and "image copies" has not been clearly defined.

The applicant is also asked to make sure that all of the terms used in the claims have antecedent basis, where needed, when correcting the problems as stated above.

2.   The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

B-169

AX061589

Serial No. 483,327   -4-

3.   Claims 1 and 3-14 are rejected under 35 U.S.C.
103 as being unpatentable over the publication by Hugh,
Boyd, Quantel.

            The apparent novelty of the claimed invention
as disclosed seem to be as follows:

            1) each stored "frame" of video data contains
both a full and a quarter resolution copy of the image;

            2) size reduction and production of the
"frame" of video data is performed by the interaction
between the size reducer and the frame store prior to
storage in the image storage;

            3) and the "frame" of video, containing both
resolution copies, is non-selectively produced for all
images that are stored.

            The above claims do not clearly describe the
apparent novelties of the claimed invention. Thus the
claims are broad enough to read upon the "Quantel
DLS6000" as described by Hugh Boyd. This system stores
a plurality of still frames on disk memory (image
memory). These "full resolution" frames can be copied
out of memory, reduced in size, and placed in any
desired position of a "frame store." (Pg. 47; column 1;
lines 11-19). These reduced resolution images can then
be stored back on disk memory (Pg. 47, column 3; lines
18-25). Thus the disc store can contain a plurality of
frames with full and reduced resolution copies. The
"frame store" can also hold either copy and can position
the reduced copies in the store as desired for output.

4.   Any inquiry concerning the merits of this
office action or earlier communications from the exa-

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Serial No. 483,327   -5-

miner should be directed to David E. Harvey whose
telephone number is (703) 557-6844. Any inquiry of a
general nature of relating to the status of this appli-
cation should be directed to the Group receptionist
whose telephone number is (703) 557-3321.

DE Harvey:klw ᕲH
12-17-84
(703) 557-6844
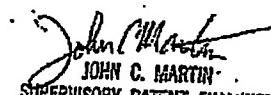
JOHN C. MARTIN
SUPERVISORY PATENT EXAMINER
GROUP 260

FORM PTO-892
(REV. 3-78)

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE

NOTICE OF REFERENCES CITED

SERIAL NO.	GROUP ART UNIT	ATTACHMENT TO PAPER NUMBER
06/483327	262	3

APPLICANT(S)

Beaulier

U.S. PATENT DOCUMENTS

		DOCUMENT NO.	DATE	NAME	CLASS	SUB-CLASS	FILING DATE IF APPROPRIATE
A		4 1 5 2 7 2 2	5/1/79	Inuiya et al.	358	102	
B		4 3 0 2 7 7 6	11/24/81	Taylor et al.	358	160	
C							
D							
E							
F							
G							
H							
I							
J							
K							

FOREIGN PATENT DOCUMENTS

	DOCUMENT NO.	DATE	COUNTRY	NAME	CLASS	SUB-CLASS	PERTINENT SHTS. DWG	PP. SPEC.
L								
M								
N								
O								
P								
Q								

## OTHER REFERENCES (Including Author, Title, Date, Pertinent Pages, Etc.)

R	Hugh Boyd , "The DLS6000 - A New Digital Still Store Library System" International Broadcast Engineer, Vol. 11, No 170, pp 46-48 3/80 (360/35.1)
S	G
T	
U	

EXAMINER	DATE	
David E Harvey	12/4/84	

* A copy of this reference is not being furnished with this office action.
(See Manual of Patent Examining Procedure, section 707.05 (a).)

AX061592

The DLS 6000
A New Digital Still Store Library System
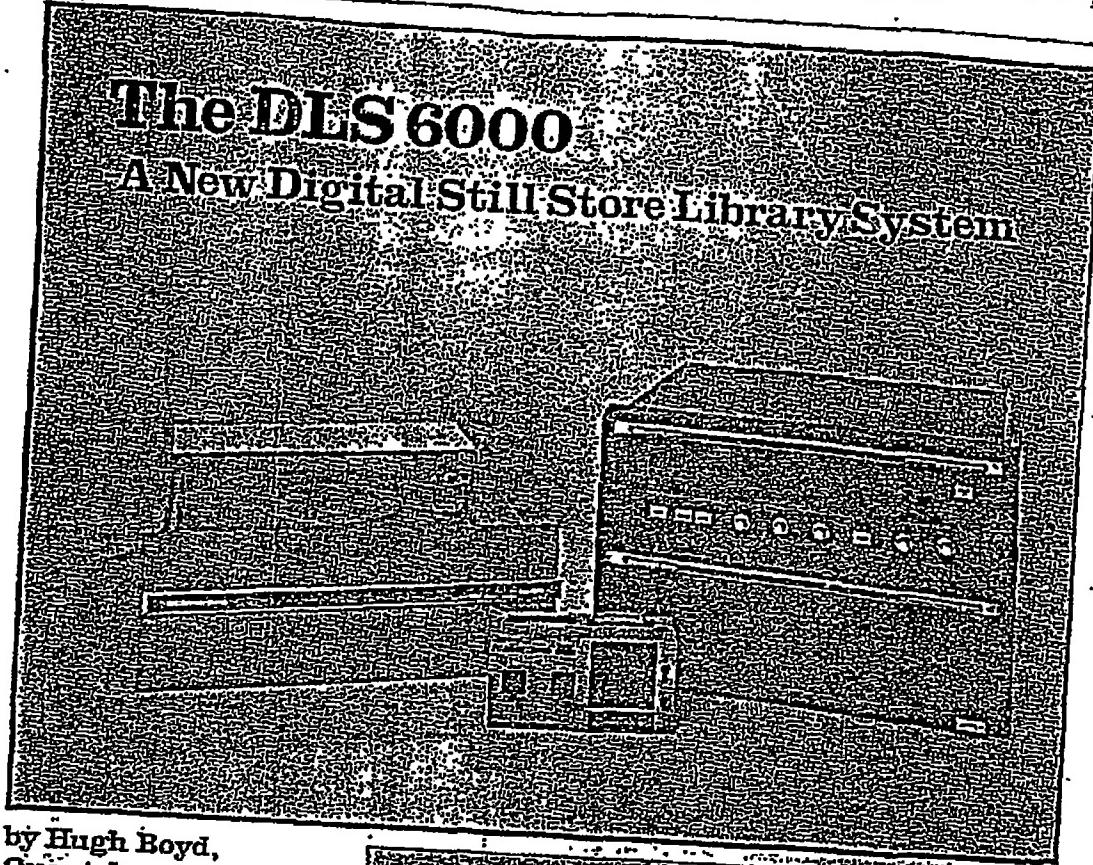
by Hugh Boyd,
Quantel.

The Quantel DLS 6000 Digital Library System was first introduced to broadcasters at private demonstrations held during last year's NAB and Montreux exhibitions. At that time, the product was still under development, and Quantel were seeking comments from their invited guests as to the final configuration of the DLS 6000. The proferred advice was considered sufficiently valuable by Quantel engineers for some of it to be included in the ultimate system design, which will be demonstrated publicly for the first time at NAB 1980.

The DLS 6000 represents a new generation of still stores for television broadcasting. The system provides not only significant improvements in basic performance over existing techniques, it also offers several unique facilities that make the unit a complete production tool. At only 10.5 inches high for the DLS 6000, and 7 inches high for the storage disc unit, the system is ideally suited for OB van use as well as in the studio.

The Digital Library System is a naturally evolutionary product to come from the Quantel stable. It is revolutionary in concept and is based on a solidly engineered, flexible piece of hardware utilising three framestores and a DEC LSI-11 minicomputer. Typically, the DLS 6000 embodies
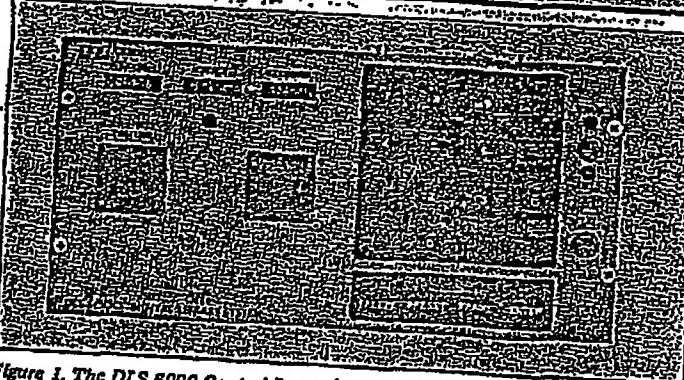

Figure 1. The DLS 6000 Control Panel

Quantel's basic principle of expandability by retrofitting new options as they become available. The word "obsolete" does not exist in the Quantel vocabulary!

Infinite Storage Capacity
The disc unit has a picture capacity of up to 340 stills. With multiple disc operation, say ten discs, 3400 pictures would be randomly accessible. However, the number of discs allowed is wisely unlimited, but is is anticipated that broadcasters requiring very large library storage will avail themselves of a video tape back-up store — a unique feature of the DLS 6000. Because the data is transferred in digital form, there is no loss of quality. Picture information can be transferred automatically from disc to a standard video cassette or reel-to-reel machine without it being modified, whether it is in use in a studio or OB van.

Transfers from tape to disc work in exactly the same way, therefore a cassette is all that is required to move information between locations. Similarly, a full archival store library can be formed from cassette or tape with more than 3000 pictures being stored on one tape. Again, being digital in format, no generation losses are seen no matter how many times the information is recorded or re-recorded.

STILL STORES

Production Effects Capability

The provision of a number of production effects seems to be a logical facility for a Quantel framestore-based product. The DLS 6000 has this integral feature for very practical reasons.

Picture repositioning is achieved by the simple movement of a joystick on the compact 8" x 4" control panel (Figure 1).

Picture compression is also achieved by moving a joystick. The stored image may be reduced to any size between normal (full frame) and virtually zero size. This feature, when used with repositioning, defines the exact size and position of a still without employing any other digital effects system.

Picture enlargement. Joystick movement enlarges the image up to two times to allow selection of a chosen portion of a still.

Variable aspect ratio. The aspect ratio of the image can be varied from the normal 4 x 3 to any rectangular shape.

Multiple picture handling. The DLS 6000 is capable of reproducing as many pictures as are wanted at the same time. This facility is clearly an adjunct to compression and repositioning. It is used either to show, at the same time, a number of participants in a discussion or event, or even to build up a complete montage of images. The pictures can be called down from the disc one at a time to show the viewer the build up, or can be called simultaneously so that only the finished composite is broadcast. Borders. The DLS 6000 is equipped with its own border generator capable of changes in hue, saturation, luminance and width. Borders can be placed around all pictures being shown if desired, although different images can have quite different border parameters at the same time. The border generator also includes a background or matte generator, further releasing the mixer for other functions.

Extensive Operating Features

Both the technical director and the system operator were kept very much in mind by Quantel when designing the Digital Library System. Each has a computer display panel, with the director's being associated with the mixer and almost always used for replay. Whereas, the panel the operator (or "composer") uses, will be essentially employed for recording. The DLS 6000 is capable of single or two person operation, so two control panels may access the machine simultaneously for time sharing.

High change rate. Pictures can be changed at a rate of two per second with complete random access. Thus, no cache memory of the day's programme requirement has to be prepared.

On-air picture change. Although the change rate is limited to two per second, the additional framestore circuitry in the DLS 6000 allows vertical interval switching between pictures. The switch is instantaneous: only the throughput rate is limited to two per second.

On-air transitions. When using the DLS 6000, a mix/effect bus can be eliminated by utilising the digital transitions available in the unit. Changes between one picture and the next can be by means of a simple cut, a programmable dissolve, or even a wipe.

Multiple outputs. Three outputs are available with the DLS 6000 — two programme and one preview. Internally generated transitions are possible with both programme outputs, or they can be used together to utilise more exotic wipes in a mixer. Keys are generated by the system to match the picture at all times.

Preview. The DLS 6000 has its own preview output which can be operated without affecting the on-air programme or transitions. The preview allows the varying sizes or positions of images to be chosen by means of cross wires controlled by joysticks, and also contains the fast viewing or "browse" feature.

Browse. The preview facility has the ability to look through the contents of the disc by displaying 25 images at a time, and slowly moving them down the screen. This rolling list of pictures allows easy viewing to find a desired frame, or alternatively, permits the showing of pre-chosen slides waiting in the "stack" for display during a programme.

On-air editing. As previously mentioned, the on-air display or transition is unaffected by previewing. Similarly, the DLS 6000 permits the capture and recording of incoming material while the equipment is being used during a broadcast. This is an essential feature to get the full benefit of the system in a news studio situation.

Asynchronous operation. The input of the Digital Library System can handle asynchronous information to allow stills to be captured from incoming ENG material.

Graphics handling. The DLS 6000 is capable of keying stored graphics over displayed images, thereby releasing the mixer from this function. Graphics may have their size and position defined quite independently of picture information, always assuring perfect readability for all sizes of titled images.

Digital re-recording of composite pictures. Composite pictures created on the preview monitor can either be stored as control parameters to ensure recall on demand on the programme outputs, or alternatively, can be re-recorded back onto disc as a complete new picture at an individual location.

Editing system. Complete sequences of commands to the DLS 6000 can be set up and stored for simple single button operation during a programme. The editing system does, however, allow simple addition or deletion of items to ensure ease of operation in a fast moving news broadcast. The mini-computer in the system will permit the addition of standard computer peripherals at a later date to accommodate even more powerful editing equipment.

Control delegation. As previously stated, the control of the DLS 6000 can be time-shared between several stations including during a live broadcast. Separate preparation and replay panels permit the technical director to remain divorced from the recording of stills from incoming ENG material.

Obviously, the basic task of the Digital Library System is to replay the correct picture from the disc store. However, the usefulness of the system is greatly enhanced by the ability to choose the size and position of the replayed picture, and to define it in accordance with the requirements of the rest of a production. The Quantel tradition of high fidelity is maintained in the quality of the images produced by the DLS 6000 at all times, whether the size of the still has been modified or not. At all sizes and shapes, the unit displays excellent image quality, with-

GROUP 123					
SLIDE	PICTURE	SIZE & POSITION	BORDER	TRANSITION	CUE
0	23	NORMAL	ON	DISSOLVE	20
1	18	COMPRESS	OFF	CUT	
2	14	ENLARGE		WIPE	10
3					
4	38	COMPRESS		SUPER	INSTANT
5	100	COMPRESS		SUPER	
6	23	COMPRESS		CUT	
7					
8	11	NORMAL		CUT	EXT
9	10				
NEXT GROUP 138					

Figure 2. An example of a typical Edit Display (as would appear on the TV monitor).

STILL STORES

out showing any hint that the video has been processed.

The Control System

The philosophy behind the control system for the Digital Library System is based on the concept of Pictures, Slides and Groups. A Picture is defined as an image on disc and has a number allocated to it at the time of recording. Pictures are normally recorded on disc at full size to give maximum flexibility on replay. A Slide is a Picture on replay that has the parameters of size, position, transition type and time, etc, allocated to it. The number of a Slide need not be the same as the number of the Picture that the Slide depicts. A Group is a collection of up to ten Slides.

It is essential to appreciate that, with this machine, defining a still merely by a number is insufficient due to the extra facilities available. Therefore, both the still and what is to be done with it must be defined before displaying on the programme output. The computer display. The extra degree of freedom made available by the DLS 6000 production features, make it necessary that at both preparation time and programme time, the operator always has a clear picture of exact machine status. In order to give the user this clear indication of the situation, a video display system has been added to the host computer, and it is via this display system that all setting of parameters is achieved.

The computer display output is added to the preview output, and hence, shares the preview screen. There are three types of computer display available to the user: Edit, Ident and Menu. A cursor display is added to all these to allow the size and shape of images to be defined on the preview monitor.

A typical example of the Edit display is shown in Figure 2. It will be seen that the Slide number is independent of the Picture number as has been described earlier.

Figure 3. Block Diagram of the DLS 6000

The Ident display overlays the true Picture number when using the "browse" feature, so that the various chosen Pictures may be easily identified.

The Menu display is a special option that allows selection of modes of use of the machine, and it is this display that is used in conjunction with the tape backing store system.

The recording chain is shown at the top of Figure 3. Input video enters the system and is immediately converted into digital format and passed to a framestore at full video data-rate. This input framestore acts as a freeze frame device and allows the user to select still pictures from the incoming live video. For simplicity, the link from the output of this store to the preview output from the DLS 6000 has not been shown, but in reality, the video follows this path allowing the user to observe the incoming picture at all times, whether live or frozen.

Once the chosen image has been frozen in the framestore it is read out from the store at disc rate via a data processor section to further reduce data rates, and then via the disc formatter to block the information suitable for writing onto the disc.

The disc itself is a latest generation Winchester drive high packing density sealed unit. The heads are of the flying type, but the construction of the disc eliminates the need to have expensive and unreliable head retraction mechanism — the heads actually land on the disc surface when the platter is not in motion. The disc data rate allows a picture to be generated in 0.5 seconds. The total package is highly reliable and rugged and includes parity check circuitry for optimum data integrity.

The replay chain, shown at the bottom of Figure 3, is obviously more complex than record due to the increased number of framestores and programme output facilities. Data from the disc passes through a disc re-formatter where the information

is sorted out from its blocks, and then onto the data processor where it is unpacked. At this point, the information is passed to one of the three framestores available, and it is now that the size change mechanism operates. If the information is routed via the preview store, no other processing is done other than reading it out of the store at full video rate into a DAC and onto the display via a proc amp. If the data is fed to one of the programme stores, it is subsequently passed to a digital combiner assembly that performs the appropriate wipe, cut or dissolve functions. Also, the combiner copes with the addition of borders or the keying of caption information over pictures or coloured matte.

For convenience, one framestore is shared between the video input facility and the preview output. Not shown in Figure 3 is the host DEC LSI-11 minicomputer that controls the whole machine and is responsible for all housekeeping tasks, the operation of the control panel and the editing system.

The tape backing store system is interfaced to the disc before and after the disc formatter and de-formatter. The information on disc has to be prepared and re-blocked by the tape formatter prior to the addition of syncs and burst for feeding to the tape system. It should be remembered that the tape system is perfectly conventional, and can be any recorder available in the studio or OB van.

When receiving information from the tape backing store, information is unpacked and blocked in a tape de-formatter before being passed on to the disc. The DLC 6000 Digital Library System is available in NTSC standard. But, as usual with Quantel, it is reasonable to assume that PAL and SECAM versions are already being developed. When they are introduced, one can expect even more flexible facilities to be unveiled, and naturally, none of them will make any other part of the existing system obsolete. ∎
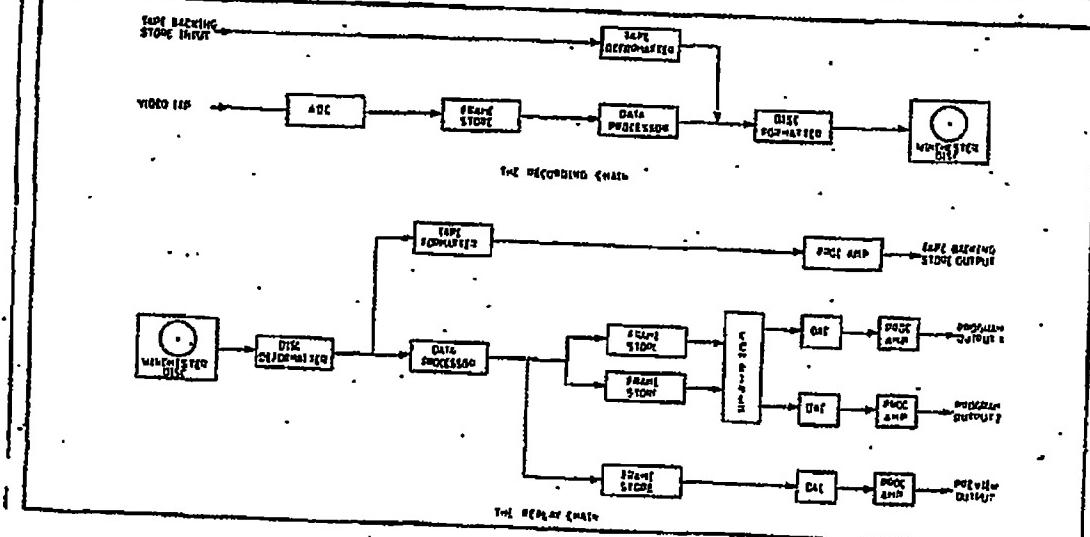
48

PATENT
2/11/86

THE UNITED STATES PATENT AND TRADEMARK OFFICE

RECEIVED
FEB 10 1986
GROUP 262

In re Application of:

DANIEL A. BEAULIER

Serial No. 740,297

Filed: May 31, 1985

Title: ELECTRONIC STILL STORE
WITH HIGH SPEED SORTING
AND METHOD OF OPERATION

Art Unit: 262

Examiner: D. Harvey

Attorney Docket No. AV-3033 N1

Honorable Commissioner
of Patents and Trademarks
Washington, DC 20231

Sir:

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231, or _____1-28-86_____

Bradley A. Perkins, Reg. # 31,408 1-28-86
Bradley A. Perkins, Reg. # 31,408 DATE

AMENDMENT

        In response to the first Office Action dated September 3, 1985, please amend the above-identified application as follows:

        IN THE CLAIMS:

        Please cancel Claim 1.

        Please amend Claim 2 as follows:

        2. (Once Amended) An electronic still store system comprising:

        an image store for retrievable storing therein a plurality of _image frame copies of_ frames of video images_, the image frame copies comprising_ [with both] a full spatial resolution image frame copy and _a_ reduced spatial resolution image frame copy of each _frame of video images_ [image frame being stored];

        a frame store which is operable in a first mode to receive _and store one of said_ _full spatial resolution image frame copies_ [frames of video images] from the image store and repetitively generate a full spatial resolution output image frame and operable in a second mode to receive from the image store and store a plurality of _said_ reduced spatial

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resolution image _frame copies_ [frames], the frame store being further operable in the second mode to repetitively generate [an] _a reduced spatial resolution_ output image frame having an image frame _comprising a_ [from each of the] plurality of _said_ reduced spatial resolution image _frame copies_ [frames] selectively located at [a] different [position] _positions_ within the output image frame; and

· a size reducer coupled to receive from the frame store a full spatial resolution image frame _copy_ and in response thereto to return to the frame store a reduced spatial resolution image frame _copy_ and wherein the frame store is operable to receive and store the reduced spacial resolution image frame _copy_ while continuing to store the full spatial resolution image frame _copy_.

Please amend Claim 3 as follows:

3. (Once Amended)   The electronic still store system according to claim 2 above, wherein the reduced spatial resolution image _frame copies_ [frames] each have a spatial resolution of one-forth the spatial resolution of the full spatial resolution image _frame copies_ [frames] in each dimension [of an image].

Please amend Claim 4 as follows:

4. (Once Amended)   The electronic still store system according to claim [1] _2_ above, further comprising a central processing unit, _controlled by an operator,_ coupled to select [in response to control by an operator] which _of said_ image frame copies are retrieved from the image store and the location within the frame store at which each _of said_ image frame _copies_ [copy] is stored.

Please amend Claim 5 as follows:

5. (Once Amended)   The electronic still store system according to claim [1] _2_ above, further comprising a central processing unit, _controlled by an operator,_ which is coupled [to select in response to control by an operator]   to command the retrieval of a plurality of reduced spatial resolution image _frame copies_ [frames] from the image store and _to select_ the placement of the retrieved image _frame copies_ [frames as reduced size image frames] within [an] _said reduced spatial resolution_ output image frame generated by the frame store.

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Please amend Claim 6 as follows:

6. (Once Amended)   The electronic still store system according to claim 5 above, further comprising an output digital-to-analog converter coupled to receive said output image frames from the the frame store and in response thereto to generate an analog video signal representing the received output image frames; and a monitor coupled to receive the analog video signal and display the output image frames represented thereby.

Please amend Claim 7 as follows:

7. (Once Amended) The electronic still store system according to claim 6 above, further comprising a video input generating an analog video signal representing a sequence of input video image frames and an analog-to-digital converter coupled between the video input and the frames store and converting the analog video signal to a digital form in which digital data representing [a] said input video image frame can be received and stored by the frame store.

Please amend Claim 8 as follows:

8. (Once Amended) The electronic still store system according to claim 7 above, further comprising a user console coupled to receive operator commands and output [received] operator command signals [commands] to a central processing unit, the central processing unit coupled to receive the operator command signals [commands] output by the operator console and in response thereto to generate control signals for controlling system devices including the input analog-to-digital converter, the image store, the frame store, the size reducer, and the output digital-to-analog converter, and a system bus [coupling] supplying the control signals to the controlled system devices.

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[Please amend Claim 9 as follows:]

9. (Once Amended)   A video still store system comprising:

a   size   reducer   coupled   to   receive, from a frame store capable of
simultaneously storing both a full size and a reduced size image data sets, a full size
image data set representing a full size image frame and produce and return to said frame
store a reduced size image data set representing a corresponding reduced size image frame
in response thereto;

an image store for storing a plurality of said full size image data sets
representing a plurality [of frames] of full size images frames and for storing a plurality
of reduced size image data sets representing a plurality of reduced size image frames
[images], each of said reduced size image data sets corresponding to one of the full size
image data sets [images, said reduced size images occupying less space within said image
store than said full size images]; and

[a] said frame store coupled to selectively receive from either an external source
or the image store and store one of said [a frame of] full size image data sets representing
a full size image frame to selectively [repetitively] retrieve and output a stored [frame of
the] full size image data set, to retrieve and communicate to the size reducer the stored
[frame of] full size image data set, to receive from the size reducer and store said [a frame
of] reduced size image data set representing a reduced size image frame corresponding to
the stored full size image data set, to selectively retrieve and output to the image store
both the [frame of] full size image data set and the [frame of] reduced size image data set,
and to receive from the image store and store a plurality [of frames] of reduced size image
data sets with the reduced size image data sets for each different reduced size image frames
being stored in a different location within the frame store such that when the frame store
operates to [repetitively retrieve and] output a stored frame of full size image data set for
use by a device generating a television signal, the reduced size [images] image frames
represented by the reduced size image data sets are disposed at different selected locations
within an output image frame represented by a [repetitively retrieved and output frame of]
full size image data set.

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[Please amend Claim 10 as follows:]

10. (Once Amended) An electronic still store system comprising:

a size reduce which receives normal size image data, from a frame store capable of simultaneously storing both full size and reduced size image data, representing a normal size video image and converts the normal size image data to reduced size image data representing a reduced size video data image and returns said reduced size image data to said frame store;

[a] said frame store coupled to receive and store at first selected locations therein normal size image data [representing a video image], the frame store being coupled to communicate full size image data to the size reducer, to receive back from the size reducer reduced size image data, to store the reduced size image data received from the size reducer in second selected locations in the frame store, and to repetitively output the full size image data, the frame store being further operable to receive and store in the first selected locations [image data representing] a plurality of reduced size image data images to form a single normal size video image comprised of the plurality of reduced size video images; and

an image store coupled to receive from the frame store, store and retrieve, said normal image data and said reduced size image data [image data representing a plurality of normal size images and image data representing a reduced size image of each of the normal size images, said reduced size images occupying less space within said image store than said full size images].

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[Please amend Claim 11 as follows:]

11. (Once Amended) A video still store system comprising:

a size reducer coupled to receive, from a frame store capable of simultaneously storing both a full size and a reduced size image data set, a   full resolution image data set representing [a frame of] a full resolution image frame and produce and return to said frame store a reduced resolution image data set representing [a frame of] a corresponding reduced resolution image frame in response thereto;

an image store for storing a plurality of said full resolution image data sets representing a plurality [of frames] of full resolution image frames [images] and a plurality of reduced resolution image data sets representing a plurality of reduced resolution image frames [images], each reduced resolution data set corresponding to one of the full resolution image data sets [images]; and

[a] said frame store operably coupled to selectively receive from either an external source or the image store and store a [frame of] full resolution image data set representing a full resolution image frame, to repetitively retrieve and output a stored [frame of the] full resolution image data set, to retrieve and communicate to the size reducer the stored [frame of] full resolution image data set, to receive from the size reducer and store a [frame of] reduced resolution image data set representing a reduced resolution image frame corresponding to the stored full resolution image frame, to selectively retrieve and output to the image store both the [frame of] full resolution image data set and the [frame of] reduced resolution image data set, and to receive from the image store and store a plurality of [frames of] reduced resolution image data sets [with the reduced resolution image data], without cutting or further reducing said reduced resolution image data set, for each different reduced resolution image data set being stored in a different location within the frame store [which] such that when the frame store operates to repetitively retrieve and output a stored frame of full resolution image data set, the reduced resolution image frames [images] represented by the reduced resolution image data sets are disposed at different selected locations within an output image represented by the repetitively retrieved and outputted [output frame of] full resolution image data set.

AX061637

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[Please amend Claim 12 as follows:]

12.   (Once Amended)   The method of operating a video still store system having an image store and a frame store coupled for bidirectional communication of video data with the image store comprising the steps of:

writing into the image store video data representing a plurality of full resolution image frames [images];

reducing said video data representing a plurality of full resolution image frames;

writing into the image store for each said full resolution image frame said video data representing a reduced resolution image frame copy thereof, in response to said writing into the image store video data representing a plurality of full resolution image frames [said reduced resolution copy of each said full resolution image occupying less space within said image store than said full resolution image]; and

transferring from the image store to the frame store for assembly in the frame store as a single composite image said video data representing a reduced resolution image frame copy of each of a selected plurality of reduced resolution image frame copies [images].

[Please amend Claim 13 as follows:]

13.   (Once Amended)   The method of operating a video still store system according to claim 12 above, wherein each reduced resolution image frame copy has a spatial resolution of one-forth the spatial resolution of the corresponding full resolution image frame in each of two display dimensions.

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Please amend Claim 14 as follows:

14.   (Once Amended)   The method of operating a video still store system having an image store and a frame store coupled to receive video data from the image store comprising the steps of:

writing into the image store video data representing a plurality of full resolution image frames [images];

reducing said video data representing a plurality of full resolution image frames;

writing into the image store for each said full resolution image said frames video data representing a reduced resolution image frame copy thereof, in response to said writing into the image store video data representing a plurality of full resolution image frames [said reduced resolution copy of each said full resolution image occupying less space within said image store than said full resolution image];

transferring from the image store to the frame store video data representing a reduced resolution image frame copy of each of a selected plurality of reduced resolution image frames [images]; and

storing the transferred video data in the frame store in locations selected to produce a composite output image frame having each of the reduced resolution image frames [images] represented by the transferred video data positioned at a selected different position within the composite output image frame.

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Please add Claim 15 as follows:

15. A video still store system comprising:

a size reducer coupled to receive a full size image data set representing a full size image frame and produce reduced size image data set representing a corresponding reduced size image frame in response thereto;

an image store for storing a plurality of said full size image data sets representing a plurality of full size image frames and for storing a plurality of reduced size image data sets representing a plurality of reduced size image frames, each of said reduced size image data sets corresponding to one of said full size image data sets; and

a frame store coupled to selectively receive from either an external source or said image store and store one of said full size image data sets, said frame store is operable such that when a full size image data set is received from an external source or is received from said image store and said image store does not contain a corresponding reduced size image data set, said frame store outputs a copy of said full size image data set to said size reducer and in response thereto receives a corresponding reduced size image data set which is outputted to said image store for storage with the corresponding full size image data set.

REMARKS

The first Office Action of September 3, 1985 has been carefully considered. Reconsideration of the application, as amended, is respectfully requested.

Claims 1 through 14 are pending in this application. Claims 1 through 14 have been amended and Claim 15 has been added.

Claims 1 through 14 were rejected under 35 U.S.C. 112, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention.

Claim 1 has been cancelled.

The Examiner notes a number of problems with Claim 2 in regards to the use of image frames. Applicant has made a number of changes to Claim 2 to correct the problems along the lines suggested by the Examiner. Other changes have been made to Claim 2 for the sake of internal consistency. Claim 2 has been amended to make clear that "a full spatial resolution image frame" refers to "image frame copy".

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Claim 3 has been amended to conform to the changes in Claim 2. Claim 3 has further been amended by removing "of an image" that is considered indefinite by the Examiner.

In Claim 4, the Examiner objects to "in response to control by an operator". Claim 4 has been amended to make clear that the central processing unit is "controlled by an operator". The Examiner notes that "image frame copies", in Claim 4, should be proceeded by "said". This has been done.

Claim 5 has been amended to conform with amended Claim 1 as requested by the Examiner. The control by an operator has been corrected as was done in Claim 4. The "output image frame" now, also, has the proper antecedent basis.

Claim 6 has been amended to conform to Claim 5 as requested by the Examiner. The phrase "image frames" is now "output image frames", thus supplying the antecedent basis required.

The Examiner finds the phrase "sequence of video image frames" in Claim 7 indefinite. This has been amended to read "input video image frames" throughout the claim, thus making it clear that these are not the "plurality" referred to in Claim 2.

In Claim 8, the operator console now outputs "operator command signals", thus correcting any inconsistency. This change also answers the question about the phrase "by the operator console". As requested, the word "coupling" used in reference to the system bus has been changed to "supplying".

The Examiner has a number of objections to Claim 9. Applicant believes that amended Claim 9 answers all these objections. The use of "image data" and "frames of image data" has been clarified. "Each corresponding", "repetitively retrieve", and "represented by a repetitively..." have each been rewritten.

Claim 10 has been extensively rewritten to satisfy the objections of the Examiner. Applicant believes amended Claim 10 to now be definite.

Applicant has amended Claims 11-14 along the lines discussed above. Applicant has further reviewed all the pending claims and has amended all the claims in light of the Examiner's 35 USC 112 objections. The applicant believes all the pending claims are now definite and satisfy the requirements of 35 USC 112. As Claims 2 and 3 are not rejected on any prior art basis, they are believed to be condition for allowance.

The Applicant's invention provides for an electronic still store system for storing, in an image store, a plurality of full resolution image frames and in response thereto,

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storing a plurality of reduced spatial resolution image frames produced by a size reducer. The system has frame store which is capable of storing both a full resolution image frame and reduced spatial resolution image frame. The frame store additionally operates in two modes. In the first mode, both a full spatial resolution image frame is received from the image store to generate an output image frame. In the second mode, a plurality of reduced spatial resolution image frames are received from the image store to generate an output image frame.

The Examiner rejected Claims 1, and 4 through 14 under 35 U.S.C. 103 as being unpatentable over the publication by Hugh Boyd, Quantel.

Claim 1 has been cancelled and dependent Claims 4 and 5 have been amended to be dependent on Claim 2. Claim 6 remains dependent on Claim 5, Claim 7 remains dependent on Claim 6, and Claim 8 remains dependent on Claim 7. As Claim 2 was not rejected on the basis of any prior art and dependent Claims 4 through 8 add considerable detail, Claims 4 through 8 are believed to be in condition for allowance.

The Boyd publication discloses a system for the storage and retrieval of video image frames. The Boyd system does not teach the use of a frame store that is capable of storing both a full resolution image frame and a corresponding reduced spatial resolution image frame at the same time. Amended Claims 9 through 11 all require the use of such a frame store. Support for this amendment can be found generally throughout the specification and specifically in Claim 2. Thus the applicant believes that amended Claims 9 through 11 are in condition for allowance.

Claims 12 and 14 have been amended such that the operation of the size reducer in producing the reduced size image data set from the corresponding full size image data set is "in response" to the writing of the full size image data set into the frame store. Boyd clearly does not teach this responsive use of the size reducer. To perform such an operation with the Boyd system an operator would have to orchestrate each step. Thus the applicant believes that amended Claims 12 and 14 are patentably distinguishable over the Boyd disclosure.

Amended Claim 13 is dependent upon amended Claim 12 and adds considerable detail and thus is also believed to be in condition for allowance.

Claim 15 has been added to more precisely claim the applicant's inventive concept. Claim 15 calls for "a frame store coupled to selectively receive from either an external source or said image store and store one of said full size image data sets". Further the

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"frame store is operable such that when a full size image data set is received from an external source or is received from said image store and said image store does not contain a corresponding reduced size image data set, said frame store outputs a copy of said full size image data set to said size reducer". This automatic use of the size reducer is clearly not taught by the Boyd publication. Again, this type of operation would require complete operator orchestration in the Boyd system. Support for this Claim can be found at least on page 3 of the specification. The applicant believes that Claim 15 is patentably distinguishable over the Boyd publication.

The Yamamoto et al reference, which was cited but not applied, does not appear to be pertinent to the claims.

In the event that this amendment does not place this application fully in condition for immediate allowance for any reason, a telephone interview is respectfully requested at the number listed below if the Examiner believes such an interview would be productive.

                                    Respectfully submitted,
                                    Daniel A. Beaulier
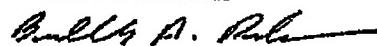
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